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09/832,232	04/10/2001	Tomohiko Yamamoto	55801 (70904)	8972

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EXAMINER	
NGUYEN, FRANCIS N	

ART UNIT	PAPER NUMBER
2674	

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14

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/832,232	YAMAMOTO ET AL.	
	Examiner	Art Unit	
	FRANCIS NGUYEN	2674	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 November 2003 and 24 November 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-13,16,17,19-22,24-34,36 and 37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *2-6* is/are allowed.

6)☐ Claim(s) *7-9,16,17,19-22,24-34,36 and 37* is/are rejected.

7)☒ Claim(s) *10-13* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *13*.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

1. The amendment filed on 11/17/2003 is now entered. Final Office Action is now withdrawn and allowance of pending claims 7-13, 16-17, 19-22, 24-34, 36-37 are now withdrawn.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 7, 19, 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yanagi et al. (US Patent 6,359,607) in view of Hirai et al. (US Patent 5,874,933) .

As to **claim 7**, Yanagi et al. discloses a method for driving an image display device , said method applying a voltage between a potential of signal lines (image signal voltage Vsp is applied to a pixel electrode, column 2, lines 27-28) and a potential of a common electrode (counter potential VCOM, column 2, lines 47-48) when a potential of scanning lines is ON (scanning voltage Vgh, column 2, lines 23-24, when TFT is ON state, column 3, lines 44-45), and displaying tones by modulating a pulse width of a two-value voltage supplied to the signal lines (signal driver output with voltage levels Vsn and Vsp) wherein tones are displayed by shifting phases of waveforms of the signal lines and the scanning lines (waveform of Vs and Vg are out off phase as shown in figure 12), dot inversion (column 14, lines 24-30) but fails to teach displaying by pulse width modulation.

Hirai et al. discloses that pulse width modulation technique is well known (column 2, lines 11-16). It would have been obvious to a person of ordinary skill in the art at the time of the invention to utilize the method Yanagi et al. then apply pulse width modulation technique taught by Hirai et al., to obtain the method Yanagi et al. modified by Hirai et al. because it will provide a display with many gradation levels.

As to **claim 19**, Yanagi et al. discloses a driving device (figure 9) of an image display device(column 2, lines 15-22) which includes a plurality of pixel electrodes(pixel electrode 103, column 1, lines 34-35) which are formed on a substrate(**electrode substrate**, column 1, lines 24-26), pixel switching elements which are individually connected to the pixel electrodes(**switching element 102 composed of TFT connected to pixel electrodes**, column 1, lines 33-36), a plurality of signal lines for applying a data signal according to a display image to the pixel electrodes (image signal voltage Vsp is applied to a pixel electrode, column 2, lines 27-28, **plurality of signal lines S(1) through S(n),** column 1, lines 27-29, figure 9), and a common electrode for applying a common potential to pixels (**counter electrode has a potential set to potential VCOM by counter electrode driving circuit COM** , column 2, lines 32-34, figure 9). Yanagi et al. discloses said driving device applying a voltage between a potential of the signal lines (Vs shown in figure 11) and a potential of the common electrode when a potential of scanning lines is ON (figure 12 shows scanning pulse Vg). Yanagi et al. discloses phase shifting of waveform of scanning lines to the signal lines (Vg with respect to Vs shown in figure 12), polarity inversion (Vcom changes polarity periodically as shown in figure 17, dot inversion is well known, column 14, lines 24-30). However, Yanagi et al. fails to teach pulse width modulation . Hirai et al. discloses that pulse width modulation technique is

well known (column 2, lines 11-16). It would have been obvious to a person of ordinary skill in the art at the time of the invention to utilize the apparatus Yanagi et al. then apply pulse width modulation technique taught by Hirai et al., to obtain the apparatus Yanagi et al. modified by Hirai et al. because it will provide a display with many gradation levels.

As to **claim 24**, see the same citation for claim 19 because claim 24 differs from claim 19 only in scope of image device. Note Yanagi et al. teaches image device (liquid crystal display device, column 1, lines 1-2).

4. Claims 8, 9, 20, 21, 25, 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue et al. (US Patent 6,504,521) in view of Hirai et al. (US Patent 5,874,933) and Ino et al. (US Patent 6,424,328).

As to **claim 8**, Inoue et al. discloses a method for driving an image display device (column 1, lines 6-7) , said method applying a voltage between a potential of signal lines (signal line voltage V0, figure 17, column 7, lines 29-33) and a potential of a common electrode (reference line drive voltage VCOM, column 7, lines 40-41) when a potential of scanning lines is ON (figure 17, TFT is switched ON, column 10, lines 7-8), and displaying tones by modulating a pulse width of a two-value voltage supplied to the signal lines (voltage levels V0A/V0B shown in figure 17) wherein tones are displayed by shifting phases of waveforms of the signal lines and the common electrode (waveforms of signal lines V0A/V0B versus Vcom are out off phase as shown in figure 17), teaches polarity inversion (Vcom is polarity

inverted periodically shown in figure 17) but fails to teach displaying by pulse width modulation.

Hirai et al. discloses that pulse width modulation technique is well known (column 2, lines 11-16). It would have been obvious to a person of ordinary skill in the art at the time of the invention to utilize the method Inoue et al. then apply pulse width modulation technique taught by Hirai et al., to obtain the method Inoue et al. modified by Hirai et al. because it will provide a display with many gradation levels. Inoue et al. modified by Hirai et al. fails to teach polarity inversion. Ino et al. discloses that dot inversion is well known in the art (column 1, lines 20-23). It would have been obvious to a person of ordinary skill in the art at the time of the invention to utilize the method Inoue et al. then apply pulse width modulation technique taught by Hirai et al., dot inversion as taught by Ino et al. to obtain the method Inoue et al. modified by Hirai et al. and Ino et al. because it will improve image quality as taught by Ino et al. (column 1, line 23).

As to **claim 9**, wherein the waveform of the common electrode is off-phase by a certain degree with respect to the waveform of the scanning lines (Inoue et al., waveform of counter electrode Vcom is off phase with respect to waveform of scanning lines as shown in figure 17).

As to **claim 20**, Inoue et al. discloses a driving device of an image display device an image display device (column 6, lines 25-26) which are formed on a substrate(**TFT substrate**, column 6, line 34), pixel switching elements which are individually connected to the pixel electrodes (**TFT 14**, column 6, line 29), a plurality of signal lines for applying a data signal according to a display image to the pixel electrodes (signal line 12, column 6, lines 37-38),

and a common electrode for applying a common potential to pixels (**common electrode 76, column 1, lines 35-36)** ,

said driving device applying a voltage between a potential of the signal lines (signal voltage V0A/V0B shown in figure 17) and a potential of the common electrode when a potential of scanning lines is ON (figure 12 shows scanning pulse Vg) . Inoue et al. teaches a signal line driving section for supplying a signal (drive circuit for generating signal line drive voltage, column 3, lines 22-25), phase shifting of waveform of counter electrode and waveform of signal lines (figure 17 shows phase shift of Vcom and signal line voltage V0A/V0B) but fails to teach pulse width modulation .

Hirai et al. discloses that pulse width modulation technique is well known (column 2, lines 11-16). It would have been obvious to a person of ordinary skill in the art at the time of the invention to utilize the method Inoue et al. then apply pulse width modulation technique taught by Hirai et al., to obtain the apparatus Inoue et al. modified by Hirai et al. because it will provide a display with many gradation levels. Inoue et al. modified by Hirai et al. fails to teach polarity inversion. Ino et al. discloses that dot inversion is well known in the art (column 1, lines 20-22). It would have been obvious to a person of ordinary skill in the art at the time of the invention to utilize the apparatus Inoue et al. modified by Hirai et al. then apply pulse width modulation technique taught by Hirai et al., dot inversion as taught by Ino et al. to obtain the apparatus Inoue et al. modified by Hirai et al. and Ino et al. because it will improve image quality as taught by Ino et al. (column 1, line 23).

As to **claim 21**, see the same citation for claim 20 since claim 21 differs from claim 20 only in limitation scanning line driving section for varying an amplitude of a voltage supplied to

scanning lines between positive application and negative application to positive side and negative side in voltage application to pixel electrodes with a reference voltage 0V. Inoue et al. teaches polarity inversion of signal voltage and common electrode voltage (figure 17, abstract, column 4, lines 64-65), scanning line driver (gate driver 28 shown in figure 6) with scanning line voltage amplitude changes between high and low (figure 16).

As to **claim 25**, see the same citation for claim 20 since claim 25 differs from claim 20 in scope of image device (Inoue et al., liquid crystal display device, column 6, lines 25-26).

As to **claim 26**, see the same citation for claim 21 since claim 26 differs from claim 21 in scope of image device (Inoue et al., liquid crystal display device, column 6, lines 25-26).

5. Claims 22, 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue et al. (US Patent 6,504,521) in view of Hirai et al. (US Patent 5,874,933) and Ino et al. (US Patent 6,424,328) and Okada et al. (US Patent 5,621,426).

As to **claim 22**, claim 22 differs from claim 20 in limitation scanning line driving section for varying an amplitude of a voltage supplied to scanning lines so that a resistance of a transistor for switching ON or OFF signal application from the signal lines to the pixels is increased with time from a beginning to an end of an application time of a single pixel. Inoue et al. teaches gate driver 28(column 6, lines 64-65), TFT switching ON/OFF via gate voltage (figures 12a/b) but does not teach resistance of transistor. Okada et al. teaches TFT 95 as switching means (column 6, lines 57-58) and resistance is increased with time from zero (switch ON) to 10 exp 6 (switch OFF) (figure 16). It would have been obvious to a person of ordinary skill in the art at

the time of the invention to utilize the apparatus Inoue et al. modified by Hirai et al. and Ino et al. and implement the increase of resistance of a switch as taught by Okada et al. , to obtain the apparatus Inoue et al. modified by Hirai et al. Ino et al. and Okada et al. because it will help reduce through current by regulating the rising characteristics of the switch as taught by Okada et al. (column 10, lines 61-63).

As to **claim 27**, see the same citation for claim 22 because claim 27 differs from claim 22 in scope of image device. Note Inoue et al. teaches liquid crystal display device (column 6, lines 25-26).

6. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hirai et al. (US Patent 5,874,933) in view of Okada et al. (US Patent 5,621,426).

As to **claim 16**, Hirai et al. discloses a method for driving an image display device, said method displaying tones by modulating a pulse width of a two-value voltage supplied to the signal lines (pulse width modulation is well known technique in the art, column 2, lines 14-15) signal driver output with two-value voltage V3 and V5 as shown in figure 7) but does not teach resistance of a transistor. Okada et al. discloses a resistance of a transistor which switches ON or OFF signal application from the signal lines to pixels (switching element 95 as thin film transistor shown in figure 8) ; figure16 shows this resistance increases with time from a beginning to an end an application time of a single pixel, where the application time of the single pixel is one horizontal period (since TFT is a switching means, interval T1 shown in figure 16 corresponds to the claimed application time). It would have been obvious to a person of ordinary skill in the art at the time of the invention to utilize the method Hirai et al. for pulse width modulation technique and switching the TFT via application of gate voltage as

taught by Okada et al. to obtain the method Hirai et al. modified by Okada et al. because it will provide a multiple gradation display with reduced noise.

7. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hirai et al. (US Patent 5,874,933) in view of Okada et al. and Yanagi et al. (US Patent 6,359,607).

As to **claim 17**, Hirai et al. modified by Okada et al. fails to teach wherein the resistance of the transistor is varied by varying a gate voltage . Yanagi et al. discloses voltage-drain currency characteristic of the TFT , wherein a drain currency(ON resistance) linearly varies depending on gate voltage (column 7, lines 12-13). It would have been obvious to a person of ordinary skill in the art at the time of the invention to utilize method Hirai et al. modified by Okada et al. then activate the scanning line connected to a TFT via variation gate voltage as taught by Yanagi et al. to obtain the method Hirai et al. modified by Okada et al. because it will reduce flickering and display defects, as taught by Yanagi et al. (column 8, lines 10-12).

8. Claims 28, 29, 30, 34, 36-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US Patent 6,496,170) in view of Sim (US Patent 6,091,390).

As to **claim 28**, Yoshida et al. teaches an active matrix-driven image display device (liquid crystal apparatus, see Abstract) and associated method including an image display panel (active matrix panel 73 with driving circuitry shown in figure 8) for displaying an image by switching by a plurality of active elements (thin film transistor 14, column 6, lines 30-32) , said driving device comprising:

a voltage varying circuit for varying a voltage (signal voltage correction circuit 79 shown in figure 8) of a signal for driving the active elements according to temperature change of the

image display panel (temperature signal input to signal voltage correction circuit 79 as shown in figure 8) , so as to carry out temperature compensation of the active elements.

Yoshida et al. teaches data signal driver 75 (figure 8) but fails to expressly teach a step-up circuit. Sim discloses level shifter in a column driver of a TFT LCD as well known in the art (column 1, lines 25-26, figure 1), level shifter 44 (column 3, lines 20-22, figure 4). It would have been obvious to a person of ordinary skill in the art at the time of the invention to utilize the apparatus Yoshida et al. then specifically provide a level shifter in the data signal driver , as taught by Sim to obtain the apparatus Yoshida et al. modified by Sim because it will result in proper driving voltage level to drive the electrodes of the active matrix panel.

Note figure 1 shows output of signal voltage correction circuit 79 is fed into the data signal driver 75 which then drives the active matrix panel 73; this corresponds to the limitation said signal voltage for driving the active elements being stepped up by the step-up circuit after being varied by the voltage varying circuit .

As to **claim 29**, Yoshida et al. in view of Sim teaches a liquid crystal display panel (Yoshida et al. , active matrix LCD panel 73 shown in figure 1).

As to **claim 30**, Yoshida et al. in view of Sim teaches a temperature detector (Yoshida et al., temperature sensor 86 shown in figure 8).

As to **claim 34**, Yoshida et al. in view of Sim teaches that applied voltage of a tone signal is varied according to temperature change (Yoshida et al., temperature signal is input to signal voltage correction circuit 79 shown in figure 8, and output of signal voltage correction circuit 79 is provided to data signal driver 75) .

As to **claims 36-37**, Yoshida et al. teaches a driving device of an active matrix-driven image display device and associated method(active matrix panel 73 with driving circuitry shown in figure 8) having an image display panel for displaying an image by switching by a plurality of active elements (thin film transistor 14, column 6, lines 30-32) , said driving device comprising: a voltage varying circuit for varying a voltage (signal voltage correction circuit 79 shown in figure 8) of a signal for driving the active elements according to temperature change of the image display panel (temperature signal input to signal voltage correction circuit 79 as shown in figure 8) , so as to carry out temperature compensation of the active elements.

Yoshida et al. teaches data signal driver 75 (figure 8) but fails to expressly teach a step-up circuit. Sim discloses level shifter in a column driver of a TFT LCD as well known in the art (column 1, lines 25-26, figure 1), level shifter 44 (column 3, lines 20-22, figure 4). It would have been obvious to a person of ordinary skill in the art at the time of the invention to utilize the apparatus Yoshida et al. then specifically provide a level shifter in the column driver , as taught by Sim to obtain the apparatus Yoshida et al. modified by Sim because it will result in proper driving voltage level to drive the active matrix panel.

Note figure 1 shows output of signal voltage correction circuit 79 is fed into the data signal driver 75 which then drives the active matrix panel 73; this corresponds to the limitation said signal voltage for driving the active elements being stepped up by the step-up circuit after being varied by the voltage varying circuit .

9. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. in view of Sim and further in view of Hirai et al. (US Patent 5,874,933).

As to **claim 31**, Yoshida et al. fails to teach tone display by phase modulation method. Hirai et al. discloses that phase modulation or pulse width modulation for multi-gradation is well known to drive LCD, column 2, lines 11-16). **It would have been obvious to a person of ordinary skill in the art at the time of the invention to utilize the apparatus of Yoshida et al. modified by Sim, then apply the phase modulation/ pulse width modulation driving technique as taught by Hirai et al. to obtain the apparatus Yoshida et al. modified by Sim and Hirai et al., because it would provide a display with a variety of gradation levels.**

10. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. in view of Sim and further in view of Mizutome et al. (US Patent 6,037,920).

As to **claim 32**, Yoshida et al. in view of Sim fails to teach that applied voltage of a scanning signal is varied according to temperature change of the image display panel. Mizutome et al. teaches LCD display 101 wherein temperature data input to panel control circuit 105 which supplies a drive voltage control signal to a drive voltage generation circuit 104 as shown in figure 1 (column 3, lines 18-21). It would have been obvious to a person of ordinary skill in the art at the time of the invention to utilize the apparatus of Yoshida et al. then vary scan electrode drive voltage, as taught by Mizutome et al. , to obtain the apparatus Yoshida et al. modified by Mizutome et al. because it would allow sufficient temperature compensation of the liquid crystal device, as taught by Mizutome et al. (column 1, lines 38-40).

11. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. in view of Sim and further in view of Wood et al. (US Patent 5,926,162).

As to **claim 33**, Yoshida et al. fails to teach applied voltage of a common signal is varied according to temperature change of the image display panel . Wood et al. discloses a common electrode control circuit adjusting the common electrode voltage based on temperature fluctuation (abstract, figure 4, column 8, lines 22-27, lines 53-58). It would have been obvious to a person of ordinary skill in the art at the time of the invention to utilize the apparatus Yoshida et al. then provide adjustment of common electrode voltage due to temperature fluctuation, as taught by Wood et al. to obtain the apparatus Yoshida et al. modified by Sim and Wood et al. because it would result in reduction of inadvertent accumulation charge differential across the liquid crystal layer , as taught by Wood et al. (column 2, lines 53-62).

Allowable Subject Matter

12. Claims 2-6 are allowed over prior art.

13. Claims 10-13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

As to claims 10-11, none of prior art teaches a potential difference between the potential of the signal lines and the potential of the common electrode is maximum at an end of one horizontal period.

As to claims 12-13, none of prior art teaches a potential difference between the potential of the signal lines and the potential of the common electrode is minimum at an end of one horizontal period.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent	Okada et al.	5,592,190
U.S. Patent	Wakeland	5,892,496
U.S. Patent	Yoon	6,005,542
U.S. Patent	Moon	5,825,343
U.S. Patent	Iemoto et al.	5,300,945

Reference Okada et al. is made of record as it discloses a liquid crystal display apparatus with better temperature compensation .

Reference Wakeland is made of record as it discloses pulse width modulation technique.

Reference Yoon is made of record as it discloses a method for driving a thin film transistor liquid crystal display device.

Reference Moon is made of record as it discloses a driving device and method for a thin film transistor liquid crystal display.

Reference Iemoto et al. is made of record as it discloses a drive circuit for an active matrix display.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Francis Nguyen **(8:00AM to 4:30PM) whose telephone number is** (703) 308-8858.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, **Richard Hjerpe**, can be reached at **(703) 305-4709.**

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

FRANCIS NGUYEN

Examiner

Art Unit 2674

December 17th, 2003

RICHARD HJERPE

SUPERVISORY